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ABSTRACT

In 1986, an academic program review of the biological sciences programs of the universities in the State University of Florida System was performed by a team of 13 consultants. This report of that review includes: (1) the background of the review; (2) a statement of the status of biological science instruction; (3) a review of the 1978 assessment and responses to that review; and (4) results and recommendations of the 1986 review. Included in the 1986 review are recommendations concerning space, expenses, equipment, stipends for graduate assistants, natural resources, interface opportunities, an affiliate doctoral program, affirmative action programs, and individual universities and departments. Appendices include tables of student and faculty populations and Bachelors, Masters, and Doctoral degrees granted. (CW)

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BIOLOGICAL SCIENCES

PROGRAM REVIEW

State University System of Florida

JUNE, 1988

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STATE UNIVERSITY SYSTEM OF FLORIDA

BIOLOGICAL SCIENCES PROGRAM REVIEW

CONSULTANT'S REPORT

Dr. Edward Kormondy
Lead Consultant

Office of Academic Programs
State University System of Florida
Board of Regents
Tallahassee, Florida

Accepted by the Board of Regents May 14, 1987

BOR 87-5

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PREFACE

A rigorous academic program review is a challenging, demanding, and even exhausting undertaking. Compounded by encompassing nine institutions within a single system escalates the process in exponential fashion. My colleagues and I each felt this opportunity to serve as a priority professional responsibility and as an opportunity to assist the singularly important cause of biological education. We trust our perceptions are reasonably on target, and that our recommendations singularly and collectively will be constructively assistive to the universities, separately and collaboratively. We likewise acknowledge that even with the best of briefing materials and the most candid of discourse none of us can apprehend, let alone comprehend, the complexity of a given department in the context of its particular university milieu in the course of a day or two. Yet, too long an involvement can lead to a blurring of what may appear in sharper relief on the quicker oversight view; the balance is somewhere between. With these advantages of the short-term outsider and friendly critic and the disadvantages of the long-term insider and biased observer, the review process achieves something of the golden mean and must be left at that. Again, may the benefits be worthy of the effort.

Our efforts, however, were certainly matched by those whose endeavors facilitated our charge: the coordinators, in all but two instances also doubling as department chairmen, who supervised and/or actually prepared the self-study materials, arranged and rearranged meeting schedules, transported us and arranged our accommodations, and otherwise met our various needs; to the senior university administrators--who candidly and critically provided

their perceptions and insights in the context of their respective university; the faculty, support staff and students, present and former, who gave of their time, sharing their perceptions, aspirations, and despairs; chairs or directors of departments and programs served by or serving the life sciences; Dr. Grace McWhorter who coordinated the initial briefing session at the System office, the scheduling of visits, and overall guidance for the review. Without this interactive network these reviews could not have been successfully concluded. And, as Lead Consultant, without the superb professional service of the excellent University Consultants, my task would have been impossible.

University Consultants

Dr. Michael Clegg, Department of Botany and Plant Science, University of California-Riverside, Riverside, CA 92521

Dr. Stanley Dagley, Head and Regents Professor, Department of Biochemistry, University of Minnesota, St. Paul, MN 55108

Dr. William R. Dawson, Professor of Zoology and Director, Museum of Zoology, University of Michigan, Ann Arbor, MI 48109

Dr. Ray Evert, Professor of Botany, University of Wisconsin, Madison, WI 53706

Dr. Nelson D. Goldberg, Professor of Pharmacology, University of Minnesota, Minneapolis, MN 55455

Dr. James H. M. Henderson, Professor of Biology, Tuskegee University, Tuskegee Institute, AL 36088

Dr. Thomas C. Jegla, Department of Biology, Kenyon University, Gambier, OH 43022

Dr. Arthur C. Mathieson, Department of Biology, Jackson Estuarine Laboratory, University of New Hampsire, Durham, NH 03824

Dr. Richard S. Miller, Ostler Professor of Ecology, School of Forestry, Yale University, New Haven, CT 06520

Dr. Stephen A. Wainwright, James B. Duke Professor of Biology, Duke University, Durham, NC 27706

Dr. Charles O. Warren, Provost and Vice President for Academic Affairs, SUNY College at Cortland, Cortland, NY 13045

Dr. Harriet L. Whipple, Professor of Biology, Georgia College, Milledgeville, GA 31061

Schedule of Visits

The dates indicated below for the site visits were those on which the Lead Consultant was present; with one exception, the University Consultants had already spent one to two days on the campus conducting a more in-depth assessment.

Location	Date	Coordinator	Consultants
FSU	11/11/86	Larry Abele	Kormondy, Dawson
FAMU	11/12/86	A. S. Shetty	Kormondy, Henderson
UWF	11/13/86	Peggy Winter	Kormondy, Jegla
UF	11/14/86	Frank Nordlie	Kormondy, Degley, Evert, Goldberg, Miller
FIU	12/1/86	John Makemson	Kormondy, Clegg, Wainwright
FAU	12/2/86	Alex Marsh	Kormondy, Wainwright
UCF	12/3/86	David Vickers	Kormondy, Warren
USF	12/4/86	Joseph Simon	Kormondy, Mathieson
UNF	12/5/86	Carole DeMort	Kormondy, Whipple

Agenda for Visits

As noted above, the University Consultants had spent one or sometimes two days on each campus prior to the visit by the lead consultant; one exception to this pattern obtained at Florida Atlantic University, a problem in scheduling. The University Consultants then had greater opportunity to do more in-depth review, even though that term is circumscribed by what can actually be accomplished in but brief visitations. The Lead Consultant and the University Consultant(s) typically met first with the President and/or Vice President for Academic Affairs or Provost and sometimes the dean of the pertinent college. One exception to this pattern obtained at Florida State University where, because it was a holiday, we met only with the Dean of the College. These meetings were followed by a schedule that included faculty,

current students, sometimes alumni, chairs of departments having substantive relationships (i.e., those served by or serving the life sciences--chemistry, nursing, etc.), tour of facilities and examination of equipment, and grants/contracts/research officers. At the conclusion of all visits save one (FSU), and following upon a caucus of the review team, a debriefing session was held with the President and/or Provost/Vice President for Academic Affairs, the dean of the pertinent college(s), the department chair and the program review coordinator (if different from the Chair). These sessions provided opportunity for a preliminary overview of major findings and recommendations and for clarification or explanation of issues. A final detailed report on each university has been submitted to the Vice President/ Provost of the respective campus and to the Lead Consultant. Highlights of those reports appear as a part of this report whose major intent, however, is an assessment of the life sciences in the State University System of Florida in broader scope.

In conducting our reviews, we were guided by various documents provided by the SUS Office for Academic Programs. While not necessarily adhering in each case to the specific outline proposed or suggested, I am confident that the salient issues have been addressed in each report based on the time available to explore them. The University Consultants' reports are as thorough as they could be and insightfully and constructively critical of the program in each university. The work of these University Consultants greatly facilitated my responsibility, and I am grateful for the opportunity for having been able to work with them in this professional endeavor.

Pertinent Statistical Information on the Departments

The Appendix contains data providing a comparative overview of the departments reviewed. The consultants were provided with considerable data and interpretative material by the program review coordinator and others before and during the site visits. Inasmuch as there were some understandable differences in the way in which such data were gathered and/or presented, the data which appear here are largely derived from official records in the SUS offices.

STATUS OF THE LIFE SCIENCES IN THE LATE 1980's

In the 1978 report of the review of the life sciences in the SUS, we believed it to be instructive to provide a statement on biology as a science and a profession. In large measure, that earlier statement remains current. Hence, in the interests of providing a context for the review that follows, I will shorten but adapt and excerpt liberally from the previous statement. Updating statements appear in capital letters.

Biology: Past and Present

As a science, biology traces its roots, at least in Western culture, to human anatomy and medicine, to natural history, and, even earlier, to the first uses of plants and animals for clothing, food, shelter, medicine, protection and companionship. These utilitarian values of science have strongly influenced the development and stature of the life sciences.

Major lines of concentration--the botanical, zoological and microbiological--developed, tending in their own, often parallel, directions, each focusing primarily on the nature and activity of whole organisms--their structure, function, natural history and classification. Because these mainstreams gouged deeply into their respective avenues of concern, it is not surprising that contemporary biology arose through forces impinging from outside, notably at the extremes of the hierarchical organization of living systems. These forces included chemistry and physics operating to unravel the "mystery of heredity" on the cellular and subcellular level and the forces of physics, chemistry, mathematics as well as economics, psychology and sociology on the dynamics of ecosystems. The frontiers of modern biology still reflect these kinds of interfaces among disciplines in such

fields as molecular biology, biophysics, bioengineering, biochemistry, psychobiology, sociobiology, and systems analysis. It is indeed difficult to define a discrete set of paradigms for contemporary biology. IF ANYTHING, TODAY THE INTERFACE/INTERDISCIPLINARY AREAS LOOM EVEN MORE STRONGLY AS RESEARCH AND TEACHING ARENAS WITH BRIGHT FUTURES.

Philosophically, studies at the cellular and subcellular level necessitated a reductionist and/or mechanistic approach (i.e., separating the parts and subsequently summing them to achieve a whole) while the ecosystem level operates with a synthetic and/or holistic approach (i.e., acknowledging that the whole is greater than the sum of its parts). During the late 1950s and through the very early 1970s, the reductionist philosophy dominated biology; the rising star of ecology in the late 1960s and early 1970s rather eclipsed this dominance with a corresponding shift towards holism. TODAY THE FIELD IS AN INTRIGUING AMALGAM OF THESE STRATAGEMS.

In 1950, biology could be taught with a microscope, hand lens, dissecting kit, plant press, vials of preservatives, and a pair of good walking shoes. The intervening period has been a period of revolution rather than evolution in biological teaching and research, a mind-boggling explosion of knowledge and understanding, of new techniques and skills, in changed needs for space, facilities and equipment. The microscope has been augmented with electron microscopes and spectrophotometers, respirometers and physiographs, homogenizers and centrifuges, scintillation counters and magnetic resonators, growth chambers and climatrons. Self-contained laboratory rooms with sit-down tables in a row and simple light sources have given way to expanded spaces, often of suites, with stand-up benches equipped with gas, air, water, and electricity, walls lined with exhaust hoods, incubators, and myriad analytical equipment down the hall. IF ANYTHING, THE INTERVENING

EIGHT YEARS HAVE SEEN EVEN FURTHER DEMANDS ON FACILITY AND EQUIPMENT BUDGETS TO ACCOMMODATE CHANGE, LET ALONE GROWTH, IN THE WAY LIFE SCIENTISTS EXERCISE THEIR PROFESSION.

Most of the faculty PRESENT IN 1978 had been born and brought up in the more classical period of biological science. Some of this group of faculty, now largely in their late FIFTIES and older, is still with the universities; MANY HAVE RETIRED OR WILL WITHIN THE NEXT FIVE OR SO YEARS. Others took advantage of various advanced study opportunities and either studied new techniques applicable to their current lines of interest or retrained into areas at times rather markedly different from their initial training. Yet others found ways of interfacing their earlier training with work in other fields--the animal behaviorist with the psychologist, the physiologist with the organic chemist or atomic physicist, the systematist with the computer scientist, the natural historian with the geochemist. Still others, perhaps hoping the world would eventually settle back to armchair comfort, decided to sit it out. A FEW of these people are still sitting and waiting for retirement, BUT THERE ARE VERY FEW NOW LEFT IN THE SUS. AND, IN FACT, THERE HAS BEEN A RATHER SIGNIFICANT TURNOVER IN THE INTERVENING YEARS SINCE THE LAST REVIEW. THIS HAS RESULTED IN SOME CONSIDERABLE VITALIZATION IN SEVERAL OF THE UNIVERSITIES AND REVITALIZATION IN YET OTHERS.

Implications

General

Among the obvious implications of these changes is the tremendous increase in cost of housing and equipping the life sciences for contemporary teaching and research. Cost increases extend not only to the initial housing and equipping but also to modification, maintenance and replacement; these costs have and will continue to escalate even with low rates of inflation. The continued expansion of information will result in ever more publication in journals, including new ones, whose costs also continue to escalate. Yet reasonable availability and accessibility to these library resources constitute a crucial component in maintaining professional competence and integrity as well as currency in the curriculum.

Among the more subtle implications of the changes in the life sciences are those on curriculum and faculty development.

Curriculum

It is crucially important that there is and be no standard undergraduate or graduate life sciences curriculum. From a national perspective, there is considerable diversity in undergraduate and graduate curricula. There are some modal tendencies, particularly in a first year course which tends to place more or less equal emphases on cellular/molecular, organismal, and populational (i.e., evolutionary/ecological) levels. However, the specific content and emphases within these three foci differ, often quite markedly, from institution to institution, textbook to textbook, and in pedagogical strategies and logistics. Upper division work tends to CENTER ON DISTRIBUTION COURSES IN THESE SAME LEVELS BUT AT ADVANCED INTENSITY. These courses and those at the graduate level largely reflect the local

faculty's disciplinary competencies and very often the historical tradition of the respective institution or department. In most cases, these different emphases build from the subject matter expertise of the faculty and the equipment garnered to support that expertise.

It is reasonable to project that the trends of the past several decades will continue to produce even more sophisticated intellectual approaches to the biological sciences and ever more sophisticated equipment to accommodate and facilitate that intellectual thrust. One implication of this tenet is that current subject matter will not be found so much wrong as wanting, and thus approach, attitude, craft, and skill will pay off in accepting and contributing to the changes that will ensue. Hence, it may well be that the particular object of study, be it molecule or mouse, will prove less important than the methods by which it is studied. This suggests that the undergraduate be given the broadest possible exploration of contemporary biology with some depth in the structural and functional biology of microorganisms, plants and animals, and a balanced combination of reductionist and holistic approaches. This should be coupled with studies in depth in the physical sciences and mathematics to perhaps an even greater extent than is common today. Further, this should be accompanied by as deep an understanding as possible of the cultural milieu in which science developed historically and currently operates. SCIENCE DOES NOT DEVELOP IN A VACUUM, AND ONE CAN MERELY LOOK AT THE SHIFTS IN NATIONAL SCIENCE POLICY TO SEE HOW PUBLIC POLICY INFLUENCES THE GROWTH AND DEVELOPMENT OF SCIENCE, PURE AND APPLIED. Further, given that the major advances in biology have come not from the center but from its edges, at the interfaces with other disciplines, exposure to the nature of interdisciplinary research, study and teaching is mandatory. Finally, as a component of culture, biology

contributes to the betterment of humanity's world; the utilitarian or applied side in such matters as environment, health, nutrition, and the potentials for human engineering cannot be ignored.

Faculty: Teaching and Research

Faculty research and teaching must respond and accommodate to the continuing changing demands in both curriculum and the nature of biology over the next decades, a period in which most current faculty will still be active (THE AVERAGE AGE IN THE LIFE SCIENCES DEPARTMENTS MODES AROUND 45). They will have to continue to grow and develop professionally or be left behind as were many of their colleagues in an earlier day. Much of this drive must come from self-initiative. To be professionally competent, intellectually alive, and actively contributing to and growing in their respective fields, faculty must be aided and abetted, encouraged and demanded. The Federal government will continue to play a major role in providing access to the means for such development via research and development grants, fellowships, institutes and training programs; but the states, through their universities, must supplement and complement the Federal initiatives through various mechanisms. INCREASINGLY, AS HAS BEEN WITNESSED IN THE PAST FEW YEARS, ONE CAN EXPECT INCREASED RESOURCE SUPPORT FOR RESEARCH, MOSTLY APPLIED HOWEVER, FROM THE PRIVATE SECTOR. The states, through their universities, must supplement and complement the Federal and private initiatives by a wide variety of mechanisms, some internal to the universities, others dependent on direct state support. The responsibilities of the State of Florida and its universities with respect to these several matters are the main focus of this report.

1978 REVISITED: AN ASSESSMENT OF RESPONSES TO THE LAST PROGRAM REVIEW

The values inherent in a program review process surface in the degree to which the commentary and recommendations contained in both a self-study and a reviewer's report are given due consideration. In their individual self-studies, the life science program units articulated an assessment of responses to the 1978 review. My colleagues and I are impressed by the degree to which the earlier recommendations were weighed and even more by the degree to which they were acted upon (specific comments will follow in the section on each university). The issues that were identified as more pervasive and involving the SUS and the universities collectively are addressed here ad seriatum as presented in the 1978 report. The quotations are from the 1978 report.

Faculty

> Faculty have a moral obligation to their profession to remain scholarly and productive. This need not imply a publish or perish milieu but rather one which actively encourages, supports, and rewards. Faculty in science should be practitioners of science and serve as exemplary role models for their students.

Role of the System and the Universities

Two of the recommendations have in substantial measure been positively responded to: 1) There is a clearer exposition of expectations for teaching, research and public service and of the reward system commensurate with these expectations. Significantly, it appears that all the universities have developed policies on return of a portion of indirect cost recovery to the sponsoring unit or principal investigator, retaining some funds centrally

for "seeding" research undertakings; 2) direct faculty development support appears to have made substantial headway, judged mostly by the absence of criticism and complaint.

There has been little, if any, "promotion of interinstitutional faculty appointments and exchanges enabling persons of particular competences both to exercise them and share them." Recognizing that physical exchanges are not always easy to effect, I reiterate the recommendation that the issue be addressed at a systemwide level (and affecting all disciplines).

Role of the Faculty Itself

Commendably, and generally throughout the System, many faculty have sustained "a professionally aggressive attitude about engagement in scholarly activity." To some extent, retirements have enabled appointment of new faculty whose professional drive is increasingly matched by the role models around them. For some longer-term faculty, but by no means all, retirement appears to be the solution.

The faculty are also to be commended for the significant increased diversification in sources of research/grant/contract funding and less dependency (in general) on those agencies whose "in-house" reporting requirements do not contribute as significantly to professional growth and stature of either the individual investigator nor of the department or university.

Equipment

Equipment, the mainstay of viable science programs, remains woefully inadequate in basic elements for teaching laboratories and in more sophisticated kinds for advanced experiences. Preventive maintenance and

service contracts on the more esoteric items are largely non-existent. Although some progress has been made in the past eight years, the situation is serious to critical in all nine universities. Rather than detail the matter here, it will be treated in substance later in this report.

Undergraduate Programs

With few exceptions, we found that the undergraduate programs are current and modern as well as balanced in content and adjunctive work, are serving other programs quite consistently well, and importantly are capitalizing on the "particular and peculiar resources at hand as well as the unique needs of the geographic area served." It is this latter attribute that stands out in many of the universities; these programs are responding to some new and unique opportunities in biotechnology without compromising the integrity of the basic program.

Graduate Programs

The 1978 report noted, "To be competitive in the national market for graduate students, several elements must obtain, among them: 1) programs must be of high quality, have a definite focus and appropriate sufficient breadth and depth on that focus, have as role models competent and productive faculty, and be sustained with appropriate levels of equipment, library, and other resources; 2) a competitive level of stipend support for graduate students both in numbers of positions and amount of remuneration; 3) timely announcement about availability of such stipend support; 4) a high degree of predictability in course offerings." These elements still apply, and the degree to which the various universities and the System responded within these eight years is a somewhat mixed bag.

Second, the 1978 report identified three policies/procedures erosive to program integrity and quality: "1) inequities between the universities on the dollar level of stipend support and ratio of those supported to those enrolled in graduate study. 2) The unconscionably late date when appointments of teaching assistants are made.... 3) The compromising of a reasonable and rational approach to effective program planning on the part of graduate students by last minute cancellation of graduate courses because of the failure to meet minimum capitation requirements."

Role of the System and Universities

The System is to be commended for being more competitive in dollar level of student stipend support and in the ratio of stipends available to the number of graduate students enrolled. There has been significant progress on this front, enhanced by the newly established tuition waivers, even though there appeared to be confusion on some of the campuses in implementing them. At the university level, only relatively few have been emboldened to "guarantee" a fixed number of awards early enough to enable departments to compete by timely announcements (more on this point under the section on "1978: New Challenges and Opportunities"). Some of the universities have made significant progress on more flexible interpretation of capitation levels placed on graduate level courses, thus ensuring more predictable course planning by graduate students; however, in several of the universities this is still a serious problem.

Role of the Departments

Substantial progress has been made in most instances in the several recommendations made in 1978. Most have tailored their offerings to faculty

competencies but few have yet taken into account the "particular educational needs of the region served," particularly those universities in the heart of quite recent biotechnological industrial development. Nearly all those offering graduate work have regularized the course offerings into predictable schedules; scrutiny of policies on acceptance and continuation of graduate students has resulted in tightened standards; tracking the careers of both masters and doctoral degree recipients is excellent in some of the universities and markedly improved in others; and, with some exceptions, sponsors of graduate students are themselves productive and competent in research. The one area in which there has not been significant progress, except in but few of the universities, is the establishment of "a teaching requirement as an integral part of the Ph.D. program, given that the majority of Ph.D. recipients enter the teaching profession." There is an additional rationale for such a requirement and that pertains to the role of teaching assistants in the instructional process, mostly at the undergraduate level. It is the undergraduate student who is shorted by inadequately prepared/trained teaching assistants, no matter how well intentioned the assistant may be.

General and Supplementary Observations

The recommendations under this section by and large applied to one or a few of the universities. They have been identified in the individual university reports. The one larger issue deserving more extensive comment relates to the addition of lower division study in those formerly upper-division-only institutions; this will be discussed in a later section.

Response of the Universities and Departments

The assessments listed below are based on comments of the University Consultant(s) of each university. For convenience of reference, the following universities have been listed in alphabetical order:

FAMU. Very few of the 1978 recommendations have been carried out. Those responded to include the addition of anatomy and physiology courses for majors and nurses and increased library resources. However, the curriculum remains very traditional and dated, the teaching load is overly heavy for the faculty, especially if research is expected as a part of scholarship, equipment derived from state funds is minimal, utilities service is still "unconscionable," and the budget is woefully inadequate.

FAU. The response has been good in most respects: the new marine facility at Gumbo Limbo will enable teaching and research in marine biology; a technician with expertise in electronics obviates part of the deficit in technical support although upgrading, maintenance and replacement of instruments to keep up with the times is the next step. The "incipient decline" in research activity and publishing productivity has sprouted and grown to maturity because of the slow development of a vigorous seminar program, Visiting Professorships and renewed vigor in applying for grants.

FIU. The questions raised in the 1978 report have been successfully addressed. Utilization of their geographical location has been improved by hiring eight new faculty members, all of whom have research interests

in biotic systems of Southern Florida and the Everglades; the hirings also achieve a better balance of faculty across a much wider range of biological subjects. Advanced courses have been added in all the research areas of the new faculty and underutilized courses have been shelved. The research seminar is going full steam and a Distinguished Lecture Series has been added. Interaction with well-known researchers from around North America has also increased with courtesy professorships for researchers at Fairchild Tropical Gardens and IFAS. Research productivity is very well in hand, as is the best use of facilities.

FSU. Significant progress has been made concerning all recommendations, but improvements relating to the following are particularly impressive: developing, promoting and rewarding professionally aggressive attitudes about engagement in scholarly activity; diversification of sources of funding for research; development of an equipment inventory and prioritization of equipment needs; preventive maintenance schedule on equipment; service functions to other departments; concomitancy of graduate programs with faculty competences and performance, physical and fiscal resources, and the particular needs of the region or state; optimizing predictable scheduling and programming and accommodating a required teaching component for the Ph.D. candidates; review of policies on acceptance, monitoring, terminating and subsequent activity of graduate students; more economical and better management of stockrooms and improved access to machine (and other) shop facilities.

UCF. Recommendations positively responded to have resulted in: development of a basic core of five courses and five upper level

options, including one in limnology; an increase in the number of teaching assistantships from two to eighteen; diversification of grant sources and publications in peer-reviewed journals; development of a seminar program albeit modest; preservation of natural areas on campus. There has been modest improvement in scheduling and availability of graduate courses. While legitimate efforts have been made to alleviate rather serious space and equipment needs, not enough has been accomplished, and the problems remain serious. Adding microbial genetics and a viable option to cell biology has not been accomplished, and the need for diversification in the botany area remains an acute need.

UF. Biochemistry and Molecular Biology. The Department has made progress on the previous recommendations, including expansion into undergraduate instruction and a broadening of graduate level instruction. There is yet inadequate undergraduate teaching in biochemistry and molecular biology with only three courses and a maximum enrollment of 250 students. The need for strength in physical biochemistry noted in 1978 has not been met; the Department has not developed a capability in this field which promises to become a major focus of attention in the near future.

UF. Botany. Progress has been made on the following recommendations: the biological sciences core curriculum is no longer "quite classical" and teaching assistants get more direction, direct supervision, and evaluation feedback. Issues still obtaining include: lack of course work in cellular botany and physiology, and physiological ecology; separation of the faculty into five (now four) buildings;

inadequate communication and interaction between faculty and students, especially undergraduate majors; lack of adequate space (identified in 1978 as the most critical problem).

UF. Microbiology and Cell Science. Most of the recommendations were acted upon including: developing, promoting and rewarding professionally aggressive attitudes toward scholarly activity; diversification of sources of research funding; the availability of major instrumentation facilities; aggressive recruitment of talented faculty. Areas (besides the lack of space and scattered facilities) which have not been adequately addressed include: a good seminar/colloquium program; making early offers of places and better stipends to graduate students; reviewing departmental service functions.

UF. Zoology. Considerable progress has been made in implementing the 1978 recommendations. The core curriculum is no longer restricted to the classical, but includes modern fields of biology very well integrated within the broad context of the theory of ecology, behavior and evolution. The group of faculty who were "outside the mainstream of biology" and/or publishing in non-refereed journals have been replaced by a vigorous cadre of active, publishing scholars. The prestige of the Department, then in some jeopardy, has been enhanced considerably. Space, then seen as "modest but more or less adequate" has now become the most critical issue and support of equipment remains "woefully inadequate," still largely being derived from research efforts of the faculty.

UNF. Recommendations which have been positively responded to include: the development and highlighting of a focus on the biology program is evident in a definite biology curriculum with four specialized options; the calendar differences between Jacksonville Community College and UNF have been resolved since both are now on the semester system. There is yet a lack of a desirable degree of diversity in the biology program, a reflection of the still small faculty (four); the need for faculty rejuvenation and energizing through the introduction of a limited graduate program has not occurred. Some rejuvenation has occurred through inducements to research activity in that faculty do receive grants from in-house funds, but there are no provisions for release time for faculty to do research and no replacement was provided for a faculty member on sabbatical, the remaining three members picking up the teaching load.

USF. With few exceptions, they have been very responsive and innovative in their solutions to the fifteen major recommendations which ranged from enhanced scholastic activities of the faculty, to diversification of research funding, preventive maintenance schedules for major equipment items, curricular development, teaching requirements for Ph.D. candidates, safety policies, etc. The University, College and Department have worked together positively in fostering many of these recommendations (e.g., access to the Medical School Library has been provided). Unfortunately, limited resources have not allowed enhanced stipends for graduate students and attention to some badly needed renovations.

UWF. Many of the recommendations have been addressed directly or indirectly: the number of microscopes has been built up to adequate levels; liaison with EPA has been effected through a cooperative agreement; at least one faculty member has had cooperative activities with the Naval Air Medical Research Institute; an active Biology Club exists. However, there has not been a strong seminar program, although there is a proposal to encourage more student-faculty interaction outside the formal classroom and laboratory. The incipient divisiveness which existed in 1978 has been exacerbated in the interim resulting in a deep cleavage in interpersonal and inter-professional relationships.

1986: NEW CHALLENGES AND OPPORTUNITIES

Biology teaching, research and public service in the public universities in the State of Florida is, on balance, in good shape, a compliment to the faculty who perform these services and to the administrative hierarchy that allots and rewards. Each of the programs has much in common, most notably the undergraduate curriculum. Each also is unique in many ways, reflecting the differences in faculty disciplinary competence and productivity, the demographics and socioeconomic attributes of its environs, and the particular opportunities provided by biogeographic environments and, of late, by biotechnological developments. The System is blessed with a highly competent and dedicated teaching faculty and research programs of national and international stature. Further, as the previous section denotes, the programs take themselves seriously, as professionals indeed ought, and have endeavored towards self-improvement. In spite of these positive attributes, my colleagues and I have discovered other issues of concern. These have been addressed by the University Consultants in detail in the individual institutional reports. Likewise, I have done so below on the System level. Focusing on these continuing or new issues might, for the reader, obscure all the positive elements that exist in System's life science programs. Thus, I reinforce the opening point that the life sciences in the public universities of the State of Florida are healthy, developing in good fashion, and productive.

The order of the following recommendations does not reflect prioritization; all these issues need to be addressed.

Space

Emerging as a crisis issue in several of the universities is the availability and configuration of space. Although various construction plans are in advanced stages of development or implementation, the availability of space for expanded research programs has reached crisis proportions in some places. The matter is no less severe relative to teaching laboratories, and in some cases to faculty office space, especially in those instances where there has been expansion of the program through the addition of lower division students or purposefully designed increases in numbers of faculty to accommodate programatic emphases. In some instances, reallocation and reassignment of space will address the shortage; in other instances, new construction is imperative.

Recommendation One. Initiate a thorough review of space needs in the life science programs, involving an assiduous assessment of alternatives to new construction as the first option and highest priority.

Recommendation Two. Encourage a reconsideration of the State formula for space. The formula appears to provide space for faculty members without regard to space needs for support staff, post-doctorates, and graduate students.

Operating Expenses

While it is a truism that there is never enough operating expense budget to support program needs, and any increase in such funds can always be appropriately utilized, there is need to continually review the sufficiency of such

funds in a field such as the life sciences in which increased sophistication of approaches in teaching laboratories occurs.

Recommendation Three. Conduct an evaluation of the degree to which operating expense budgets match the legitimate requirements of contemporary life sciences instruction.

Equipment

As noted above in the review of the 1978 study, the situation for equipment is serious. Acquisition of contemporary tools of the trade is a must if students are to be properly prepared to take their place in the world of work or research; whereas the costs of such tools may have dropped in some cases, the reductions are more than matched by the development of new instrumentation advances in the field. As was true in 1978, most of the newer instrumentation and too much of other instrumentation has been obtained through grant activity of the faculty. As was noted in 1978, "while this reflects well on the grant acquisitiveness of some of the faculty, it simultaneously reflects poorly on the State for not having adequately addressed the teaching and research equipment needs of its university laboratories...(further) such grant acquired equipment is not considered in the inventory base upon which funds are generated for maintenance, replacement, and expansion." Once acquired, a program of preventive maintenance is imperative to prolong the life and utility of equipment, especially that which receives heavy usage. While several of the universities have added a parts inventory and skilled technicians, more needs to be done to establish a cost-effective system. Also, service contracts on the more esoteric equipment appears largely to be sustained on

research grants. Unless our perceptions are in error, it appears that the two critical recommendations made in 1978 have not been heeded in sufficient measure to make a significant mark on the equipment situation. Because of this and the situation which has resulted in the interim, I repeat those recommendations. The portion capitalized represents an addition to the previous recommendation.

Recommendation Four. Substantial capital equipment funds should be provided for replacement, updating, and augmentation and/or to just properly bring to standard inadequate facilities. A THREE TO FIVE YEAR PROGRAM OF EQUIPMENT ENHANCEMENT SHOULD BE VIGOROUSLY SOUGHT FROM THE STATE LEGISLATURE, NOT JUST FOR THE LIFE SCIENCES, BUT FOR ALL INSTRUCTIONAL PROGRAMS.

Recommendation Five. Review and develop a more appropriate funding formula for equipment that: a) accounts and accommodates for equipment regardless of source of acquisition funds; b) includes an amortization model for replacement of exhausted and obsolescent equipment; c) incorporates the allocation of funds to support a preventive maintenance plan inclusive of parts inventory and skilled technical assistance; d) allows for allocation of funds for service contracts on complex and sophisticated equipment.

Graduate Assistant Stipends

The enhancement of graduate assistant stipends through raising the amount of the award and the recent augmentation through tuition waivers are highly commendable and put the System into a much more competitive situation nationally. Continuing attention to the national scene will be necessary to retain that competitiveness. One issue, remaining in yet too large a measure from the earlier review, and a new one arising since then now need attention. The former involves the untimely date by which too many students are notified on awards: several of the universities have taken positive steps in this regard by "guaranteeing" positions early enough in the year to enable timely notification, basing their allocations on past history. While this bears some risk, it is by far more cost-beneficial than playing the conservative route and risking the loss of good students.

Recommendation Six. Those universities which are not enabling timely notification of graduate assistant awards need to consult with those that do so. Timely notification would enable their programs to be in a more competitive stance in attracting and retaining graduate students.

A particular problem appears to be faced by those several universities which have recently opened their doors to lower division students. The concern, as expressed a number of times, is that the rather small lower division enrollments do not generate a sufficient number of teaching assistantships to carry the load. Although I do not know whether this is a formula driven relationship or is dependent on other methodologies and allocations, the matter does bear consideration.

Recommendation Seven. Consideration needs to be given to appropriate graduate teaching assistant support for universities recently enrolling lower division students to assure delivery of quality programs.

Preservation of Natural Resources

The campuses of the SUS developed within the last ten years have been providentially provided with considerable land for long-range use and development. Others have had access to or responsibility for unique parcels of land that harbor, in turn, some unique Floridian habitats. Further, some of these areas have become nationally and internationally recognized because of long-term studies that have been conducted in response to natural and human-induced disturbances. As universities have moral obligations relative to their roles in teaching, research and public service, I would argue that they should have as well a moral conscience to preserve precious habitat heritages for future generations to enjoy, understand, and learn from.

Recommendation Eight. The universities individually and collectively, as well as the System, should review policy on preservation of natural resources which are within their jurisdiction as a matter of inter-generational responsibility and scientific value.

Emerging Interface Opportunities

As noted in the introductory background commentary, biology's parameters are increasingly indistinct as the paradigms which have emerged and seemingly encompassed the field have been challenged, expanded, and redefined, and even eroded by productive interaction with other disciplines. The first of these recent interactions encompassed biology and chemistry along with physics

merging in the dramatic developments in understanding the dynamics of life at subcellular and molecular levels. Since then we have seen remarkable results as biology has interacted further with physics, engineering, geology, psychology, anthropology, and sociology. Some of these interactions have resulted in deeper understanding of the principles of life processes; in other instances the results have had utilitarian applications to the betterment of the human condition. Recognition of these interface possibilities still does not pervade the undergraduate curriculum to any considerable extent, and sometimes not even at the graduate level where the vision becomes even more focused as students pursue a particular line of investigation.

Recommendation Nine. Reconsideration of the curriculum should endeavor to bring awareness on the part of students of the seemingly limitless possibilities that obtain for the acquisition of new knowledge as well as applied benefits that exist at the interface of such disciplinary fields as psychology (psychobiology), physics (biophysics) and engineering (bioengineering), among others.

A different sort of interface occurs more outside than inside the university. Here I refer to the interface possibilities that exist in the public and private industrial sector. The catchword of this interaction is "biotechnology," a term that encompasses a wide range of activities from pest control to prosthetics to medical and health applications to genetic manipulation and yet others. These potential interactions raise not only legal issues dealing with patents, conflicts of interests, and obligations to both university and "inventor," but also use of university (and hence

public) land for research and development parks. They certainly raise ethical issues not only of intervention in life processes in many cases, but of proprietary interest and gain. In spite of these legitimate concerns, the human condition can stand to be bettered by biotechnological advances. What better public service from a university's standpoint and what better human application from a life scientist's professional standpoint?

Recommendation Ten. The universities individually and collectively and the System should endeavor to respond to biotechnology enterprises in ways that are commensurate with the role and mission of public universities. This mission is not only to acquire, preserve and transmit knowledge for its own sake, but to engage such knowledge to better the human condition. Enlightened policies relating to consultation opportunities, leaves of absence, patents and other proprietary rights should be developed promptly to facilitate the rapid emergence of these new technologies.

Affiliate Doctoral Program Involving FAU, FIU, UCF

This discussion and the recommendation which ensues is limited by the logistics of the site visitations to FAU, FIU, and UCF. The University Consultants, Drs. Clegg and Wainwright, visited FIU. Only Dr. Wainright visited FAU, and only Dr. Warren visited UCF. The Lead Consultant visited each of the three campuses with the University Consultant(s) and has attempted to integrate their independent reactions and his own perceptions on this important issue.

Although a doctoral program can be considered vital to the professional development of the biology faculties in the three institutions, and although

there have been expectations of such a program since each university was initiated, and although each has accomplished much in preparing for such an opportunity, the situation is uneven in the three departments. To be successful in an affiliated venture, each of the departments must be strong in either or both complementary and supplementary ways. This is not presently the case.

FIU is in the strongest position to participate in either an affiliate/doctoral or stand-alone program. Its faculty has developed several research areas of considerable strength, has established a quite respectable national and even international recognition, and professionally requires a doctoral program to develop properly professionally. The department is reasonably well equipped and has modest space to undertake advanced studies. Its curriculum is in fine shape at the undergraduate and masters level, and the faculty has proven to be excellent teachers and mentors of student research. However, additional resources, especially for facilities and equipment, must be available before a stand-alone program would be feasible.

UCF is in the next strongest position but considerably less ready. There are a number of strong faculty with good research programs who have established themselves well in the funding world; the remainder of the faculty are either relatively unproductive and not likely to change or yet to be tried true. There is an acute need for strengthening botany and organizing its curriculum theoretically. Following a period of curricular review and revision, along with careful resource planning, the department may be ready.

FAU is farthest from being ready. The incipient malaise predicted in faculty productivity in 1978 has in large measure become reality; some faculty are not producing in mainstream fields likely to engender the level

of outside grant and contract support to help underwrite graduate research at the doctoral level. The impending turnover of a substantial number of faculty within the next decade can turn this picture around quite quickly, but for the nonce, strength is not there for doctoral work.

Other factors need also to be considered. As one of the University Consultants noted in his report, "employment opportunities for biologists have been restricted for several years, in part because of the limited opportunities for teachers at the primary, secondary, and tertiary levels and in part because of lower than anticipated consulting and government service." This condition may now be in the throes of being offset by a new "baby boom" and substantial retirements at all levels of the education spectrum over the next ten years. However, some reduction of opportunities in the basic life sciences in medical and dental schools is expected as enrollments are curtailed in those fields in response to a perceived national surplus of dentists and physicians. On the other hand, biotechnology, particularly in the State of Florida, would appear to offer new career opportunities. All told, the picture is mixed but generally bright. However, the message to the SUS is how to crystal ball its contribution to whatever this need may actually be and whether this can be best accomplished by expansion of existing programs or initiating new ones.

A further and most compelling caveat, as noted by one of the University Consultants, is that "Such an initiative is counter to national trends and runs a significant risk of producing a pedestrian program and a negative impact on the resources available to the strong doctoral programs already in existence...in the State System." Each of the existing programs, as will be noted subsequently, have considerable and expensive needs to sustain and enhance their quality offerings. Further, there are considerable, and

expensive, needs in all SUS departments to sustain and enhance their quality offerings.

Yet another factor is purely pragmatic and relates to logistics. Dispersal of faculty on one campus is often sufficient to have detrimental effects on the conceptual integrity of a doctoral program, as is made evident elsewhere in this report. Dispersal involving three geographically separated campuses would not bode well for building the kind of collegiality which must obtain for a healthy program.

Given the perspectives I am able to bring to bear based on this comprehensive review process, I am compelled to make the following recommendations:

Recommendation Eleven. The affiliate doctoral proposal involving FAU, FIU and UCF should be delayed in implementation until such time as it can be established that all three institutions have commensurate and corresponding strengths in faculty, facilities and equipment to give ample assurance of being able to deliver collaboratively a high quality doctoral program. Alternatively, with some additional resources in personnel and budget, FIU might be authorized to proceed with an independent doctorate. However, no affiliate or stand-alone doctoral program(s) should be undertaken until the System weighs the legitimate concerns of the existing doctoral-granting programs as to their needs for adequate support. There is an inherent risk of developing mediocre programs if new doctoral programs are generated without addressing the needs of the current doctoral programs in the life sciences.

Affirmative Action

Given the stated goals of affirmative action programs and the known demography of the State of Florida, the productivity of the State's public universities relative to minorities in the life sciences is anything but admirable. As indicated in Table III, during the period 1981-1984, only 3 blacks and 6 Hispanics received masters degrees in the life sciences, and only one Hispanic and no blacks received the doctoral degree. While nationally the productivity of both blacks and Hispanics at the Ph.D. level in the sciences is deplorably abysmal, it strikes this consultant that the larger pool of blacks and Hispanics in Florida should engender post-baccalaureate degrees significantly above the national picture. Whether they exist or not, no specific programs aimed at increasing black and Hispanic participation in the ranks of the doctorate were called to our attention. Not so drastic a difference, yet one meriting attention, is the relatively lower production of baccalaureate and advanced degrees for women (Table IV) compared to their proportion of the total population.

Recommendation Twelve. The System should undertake a thorough assessment of doctoral production among blacks, Hispanics and women in the life sciences (and perhaps other fields). It should undertake aggressive programming to increase the participation of these two drastically underrepresented ethnic groups and of females.

While I do not have ready access to data on the available pool of potential candidates, and whereas I recognize that several of the universities have done little to no hiring in the past ten or so years, nonetheless the ethnic and sex distribution of the SUS life sciences departments (Table

V) is not commendable and warrants attention, particularly as replacement and new hirings become possible.

Recommendation Thirteen. The System and the Universities should carefully review their affirmative action policies and recruitment efforts and endeavor to more appropriately diversify their faculty with respect to ethnicity and sex.

The Universities and Departments

The following assessments are highlights derived from the in-depth reports submitted by the External Consultants to the respective universities. The universities are listed in alphabetical order to facilitate reference.

FAMU. The biology curriculum is basically traditional and classic, focussed primarily on preprofessional preparation with no acknowledgment of developments in biotechnology. The entomology curriculum is current, however. Several courses are duplicated unnecessarily among several schools (e.g., microbiology is offered in three areas) leading to underutilization of faculty, confusion on the part of students, and poor use of space. A graduate program which aggressively admits and trains minority students is needed to compensate for the lack of same in other SUS universities. Interdisciplinary ties with other natural sciences need to be strengthened. More faculty are needed to allow time for research, and encouragement is needed in grantsmanship for outside funding. One faculty member now has full teaching responsibility for all course offerings. This situation is intolerable and needs to be

addressed. One possibility would involve consolidating entomology into biology. Students should be recruited nationally given the university's stature as a place to educate black students. Faculty need to more aggressively encourage students to consider graduate programs and research fields. Technical assistance and support services need to be upgraded as does equipment. Space for faculty research is required.

FAU. The undergraduate and masters programs are sound in content and healthy with respect to quality and attitude of faculty and students; courses are rigorous and the concentrations are well constructed. Greatest strengths are in tropical biology (particularly marine and terrestrial) and microbiology. The curriculum should encourage students to take more mathematics and computer science as well as to create their own interdisciplinary programs (with chemistry, geology, ocean engineering, and psychology), although in some cases this may require additional faculty. The addition of the first and second years of the undergraduate curriculum without adequate budget support is a serious institutional oversight. Faculty are excellent teachers with high intellectual and moral standards in the matter of teaching and its administration. The incipient decline in productivity noted in the 1978 review has set in and can be rectified in the next 5 to 10 years as retiring faculty are replaced. However, many of the senior faculty have acquired a more comprehensive and intellectually profound view of science which can be shared widely through the writing of texts, lab manuals, field guides, critical essays, and reviews. Those faculty who do desire to do research should be encouraged and assisted in doing so. All faculty need to examine potential relationships with institutions,

agencies and groups in the area. Students are a delightfully diverse, bright, and cheerful group who enjoy being spoiled by excellent, caring faculty. Small grants for research and summer travel for students need to be sought from various sources (e.g., Sigma Xi). Financial support for graduate students is too low and timing of release is too late to be competitive nationally. Financial support of laboratory teaching is shockingly inadequate; laboratory facilities and equipment are just adequate; library facilities are appreciated; support staff are excellent, but there is justification for additional staff; space is cramped but just adequate; however, a new building is planned that will allow biology to expand to its own building.

FIU. New faculty appointments made during the past five years have been excellent. The department has a unique sense of esprit and an unusual degree of mutual cooperation among its members. The teaching program is effective in meeting the needs of biology students and students in allied programs. Undergraduate students are provided with original research training, contributing to their subsequent professional success. All graduate students interviewed were pleased with their educational experience, but noted shortcomings including: need for more graduate level courses; inadequate library resources; Teaching Assistant stipends are very low and notification is very late; out-of-state tuition waivers are inadequate. The research record of the department is good: it has the strongest pattern of external funding of any science department in the University and has been increasing in the past several years at a healthy pace. There is a sustained record of publication in scholarly journals. The potential to develop a

strong national and perhaps world-class reputation is in the offing with the emerging program in tropical biology being especially promising as is marine aquaculture. The service function is adequately performed and the EEO/AA record appears good in faculty recruitment. The support system is inadequate in several respects: library biology holdings are reported to be inadequate; teaching laboratories are at capacity and cannot sustain much further growth in student enrollment; since faculty are forced to do most of their own typing, each should have his/her own computer; support personnel are inadequate in the animal care facility, creating problems with USDA inspections; office staff is severely strained; space is inadequate for the present program and unthinkable as space support for a new doctoral program. The department is well equipped owing to faculty efforts to secure equipment grants; equipment is well maintained and service contracts are in force on major items. Increased interaction with the Drinking Water Research facility is encouraged.

FSU. The department ranks as one of the stronger state supported programs in the Southeast and among the major research universities in the nation, though not in the first rank. It has several internationally known scholars. The department combines breadth and strength through its programs and the interdepartmental programs in which it participates. Plans for development of interdepartmental research programs have positive implications for biotechnology. The undergraduate program has a biotechnology channel. Areas such as ecology and psychobiology afford national leadership; there is a substantial capacity for instruction and research relating to environ-

mental problems in northwestern Florida. A significant portion of the graduates of the Program in Medical Sciences (PIMS) return to practice medicine in northwestern Florida. There has been an expanding relationship between some areas of the Life Sciences and governmental bodies and biotechnological industries: a caveat--this relationship should not erode the role of the faculty member as a scholar within the university community by confining his or her activities to proprietary research. Expansion of undergraduate training in biotechnology and the proposed interdepartmental research program in biological structure could each involve the addition of faculty and substantial set-up costs. There is an able faculty, many having completed doctorates at leading graduate institutions, most being productive in research and successful in competition for external research funding. There is a good sense of staffing initiatives to round out faculty strength (plant evolutionary biology and psychobiology). Admission standards <u>for undergraduates</u> would appear to handicap FSU in its quest for national eminence; graduate students appear to be well qualified though their scores on the GRE average slightly below that of their peers in nationally prominent graduate programs in biology. The curriculum is diversified with widely elected courses for non-biologists and several core courses for graduate students, though certain of the latter are offered on too unpredictable and infrequent schedules. Laboratories are inadequate for instruction and meeting OSHA requirements; too much equipment is derived from externally funded research, and its use in this way appears detrimental to research efforts. The new Science Library should greatly facilitate access to library holdings. Animal care facilities do not meet Federal standards, thus having a potential

deleterious affect on research operations. Research laboratories in Conradi are inadequate as are accommodations for graduate students. State funding of instructional operations and research is lower than desirable, necessitating excessive reliance on external research funding resources. Nonetheless, resources are used efficiently. There is an impressive concern for the preparation of science teachers, particularly at the secondary level; an increase in the number and level of Life Sciences credit hours in that program appears desirable. There is also a highly successful program for middle school students ("Saturday at the Sea" and a six-week summer camp program for gifted 11th graders."

UCF. The department has created a substantive, student-centered and highly productive program. Continued and even greater success will be a function of the willingness to openly discuss and agree upon less diffuse, more thematically focused undergraduate and graduate educational goals. Space and facilities are inadequate and there is a rather critical need for additional faculty lines (e.g., a molecular biologist who employs plant cells and tissue culture research methodology to maintain, much less enhance, the quality of the undergraduate experience.) The various curricula show unnecessary diffuseness, excessive redundancy, and the maintenance of relatively narrow options with low enrollments, all of this straining resources and inhibiting timely responsiveness to student and regional interests and needs. All future curricular offerings might be organized into two conceptual themes, Cellular and Molecular Biology and Organismal and Environmental Biology. This conceptual approach should be applied to master's (and

doctoral) programs as well. The department's principal contributions to the University's General Education Program are excellent, although there is a need for an additional teaching laboratory and technical assistance. Faculty are exceptionally dedicated teachers, are accessible and genuinely concerned about student welfare. The Pre-Health Professions Advisement Office receives high marks. The success of the graduate programs and its graduates is obvious and admirable. Many faculty maintain active research programs and have national and/or international reputations. Cooperation with other departments seems to occur readily; productive teaching and research interactions with biochemistry are impressive. Support staff are serious, dedicated, and provide good service. Undergraduates and graduate students are lively, bright, inquisitive, and well motivated; financial support for graduate students is perceived as limited and often not available in a timely fashion. Continued support for development of the campus arboretum is in order. Faculty should be encouraged to take full advantage of the presence of the Central Florida Research Park. The department should: take the lead in exploring questions of values, ethics, and social responsibility in science and technology; be encouraged to increase their strong record and reputation with the Office of Sponsored Research; assure quality advisement across the department; seek new collaborative associations (e.g., with psychology and engineering); develop collaborative efforts with colleagues at sister institutions especially in areas where faculty have expertise that is not complemented by UCF's geography (e.g., marine science).

UF. Biochemistry and Molecular Biology. New leadership has resulted in upgrading of spirit, the addition of four younger faculty, some improvement in equipment and facilities and in research and teaching thrusts. Teaching responsibilities have expanded to include undergraduate instruction, and the graduate level offerings have been broadened and improved. The current level of federal research support is excellent, virtually all faculty being funded. Research efforts are very active and of high quality; almost half the faculty has achieved national and/or international prominence. The quality of the graduate student body is very good to excellent, their program providing them with a feeling of worth. The new facility will permit increase in space and room for at least two additional faculty and will consolidate the faculty in a single location. Problems needing to be addressed include: maintaining a level of general high quality in the face of nationwide competition for federal funds, quality graduate students, and highly qualified faculty; increases in the number of teaching assistantship; acquisition of more advanced instrumentation; developing a capability in physical biochemistry, which is currently deficient. The overall organizational structure of biological and life sciences education and research at the University needs to be considered and a plan developed for effective and integrated activity to maximize efficiency and to enhance the University's level of excellence. There is currently inadequate undergraduate teaching in biochemistry and molecular biology in the University; two to three times the current number (250) should have access to such coursework. The planning should include: utilization of available expertise, particularly the visionaries on campus; integration of teaching and research efforts in

biochemistry and molecular biology across department and collegiate lines; a physical facility identified or constructed in close proximity to the Health Sciences, IFAS and Liberal Arts (e.g., A Biotechnology Center and/or a Center for Biological Sciences).

UF. Botany. The Department could and should rank among the top ten in the Country. Most of the faculty have active research programs and all have very respectable publication records--the nucleus exists around which to build a strong department. Those faculty with heavy teaching loads are making positive contributions to the teaching mission of the Department. Attempts to motivate the less research-productive members have not been successful. Morale of the faculty is very low, the feeling being that the Administration has paid too much attention to the few nonproductive members while failing to recognize the substantial contributions that are made. There is a lack of leadership that can be provided only by a "permanent chair." There is an absence of a strong biochemistry component and there is need of a plant physiologist with strong ecological interests. A program in molecular biology has been initiated, research and teaching in tropical ecology have been expanded, instruction in systematic botany has been revitalized, and the introductory botany course has been reinvigorated. Among recommendations made: recruitment of an outside Chairperson; new faculty in molecular genetics, biochemistry and physiological ecology; all search committees should include members from outside the Department and should make a sincere effort to find highly qualified women; endeavor to retain the productive members rather than have them join the IFAS faculty; allow faculty to hold joint appointments in IFAS departments;

strong administrative support for the Herbarium. Graduate students expressed great satisfaction with their experience; all teaching assistants feel they are being provided with adequate supervision and evaluation feedback. The CORE curriculum is no longer classical; both undergraduates and graduate students are well served by the courses offered, but there is serious deficiency in instruction in biochemistry for both undergraduates and graduate students in the biological sciences. The most critical problem is that of space, a critical problem in 1978 with little change since then. This inadequacy will make recruitment of a new Chairperson and of needed faculty very difficult.

UF. Microbiology and Cell Science. The Department has an extraordinary record of achievements despite the severe handicap of its confinement in space. Its courses are relevant and oversubscribed, and its research is a good blend of pure and applied, related to the economy of the State of Florida. Twenty percent of the University's Phi Beta Kappa's have received a B.S. in Microbiology and Cell Science in the past two years. The large rise in undergraduate teaching with no net increase in faculty numbers generates a heavy teaching load which is excessive by comparison with good research departments. The overcrowding also precludes gifted undergraduates from the opportunity to do research. Postdoctorates have increased and research workers are being attracted to the Department by faculty reputations; caution should be exercised to avoid favoring post-docs over graduate students, however. Support is needed for more graduate student teaching assistants or non-tenure track instructors. Recruiting from other universities is

encouraged once the overcrowding and faculty dispersal problems are resolved. Erratic variation in the time in which funds allocated for graduate student stipends were made available also hindered efforts to attract graduate students by not being able to make firm offers in March or April. The decision to place major instrumentation facilities in the Department, was sound and is beginning to have an impact on research programs. Although the faculty is proud of its achievements, the problem of accommodation has reached crisis proportions. All but three of the faculty have extramural funds. There is, however, a need to bring in vigorous young faculty with an eye to the future (the average age is 50 years). Although the undergraduate program is well respected, there is lack of access to and availability of biochemistry and molecular biology to the degree it should be to bring young undergraduate biologists into the 1980s.

UF. Zoology. The content of the curriculum is strong across all fields except biochemistry and molecular biology. It is particularly strong in the broad area of ecology and evolution, ranking among the top four nationally. A possible solution to the biochemistry/molecular biology hiatus would be by appointments in botany. There is good interaction with other programs in the University as evidenced by joint appointments and membership on graduate student committees. Integration is unusually, if not exceptionally, good within the Department. The quality of teaching appears to be excellent; faculty are current in their fields as reflected in course content. The research record of the faculty is outstanding; almost all faculty have very active research programs and strong publication records. Almost without exception, each faculty

member is a leader in his/her field and is recognized nationally and internationally. Recent appointments have built on the strengths of the Department, the faculty complementing each other within the broad context of ecology, behavior and evolution. Most faculty contribute to the affairs of the Deparment and University. Graduate students were impressive for their enthusiasm for science, knowledge of their fields, and interest in the Deparment; they have good success in placement upon completion of their degrees. The quality of graduate students is equal to that of a very good to excellent major university. However, the University will not remain competitive for such students at the present level of graduate student stipend support. The new library will be an outstanding facility, although it will have to increase its acquisitions significantly to be ranked with the most important science libraries. Teaching laboratories are less than adequate. In view of the concerns raised independently by each of the University Consultants for the University of Florida, the Office of the Provost should initiate a consideration of the availability and accessibility of course offerings in biochemistry for students in the several life sciences programs arrayed among the three academic jurisdictions to assure that these students are not disenfranchised from instruction in an integral and significant aspect of contemporary biology.

UNF. The introductory biology courses offer an excellent, well-balanced background; the content is current and the courses are rigorous. Labs accompanying the courses are operated in an outstanding manner and provide the students a diversity of experiences. Upper division courses provide a sound base preparing majors with sufficient breadth. There is,

however, a lack of desirable diversity of elective upper division courses, especially courses dealing with higher animals, particularly for pre-professional students. Owing to demands presented by the introduction of freshman and sophomore students, the venture courses have been deleted, regrettably. Service courses are sufficient and appropriate. There is a strong group of supportive courses in chemistry, physics, and mathematics. There is an outstanding cooperative spirit between the Division of Education and biology personnel. Articulation with Jacksonville Community College is especially good: members of the faculties have worked on joint grants, and there has been some faculty exchange. Given limitations of facilities and personnel, it is not appropriate to add any new programs but rather to strengthen the existing program. There is need for increased time for pre-professional advisement. A graduate program is not feasible at this time: the faculty is too small, and more research-oriented faculty will be necessary. The faculty are well-qualified and offer a degree of diversity in training and experience. Student evaluations rate the faculty above average in teaching effectiveness. Continued support is needed to ensure the stimulation and professional development of the faculty. Upper division course scheduling of required courses is limited, often resulting in delays in graduation--this is a function of the limited number of faculty. There is also a problem in scheduling general biology in the fall quarter, again a function of the limited number of faculty as well as of lab space. Students should be advised by faculty in their major, which is not the case now. As the present freshman-sophomore students indicating an interest in majoring in biology move to the upper division, there will be a very severe crunch in space and course offerings unless

additional faculty are added. The library is very adequate for an undergraduate biology program. Cooperative education opportunities in government and private agencies are offered. Computer capability is limited and must be addressed. Although equipment has been well-maintained, it is rapidly approaching obsolescence and dysfunction. Service contracts are encouraged for some equipment. Support personnel are very effective and adequate in number; however, as laboratory space increases, more assistance will be required.

USF. The undergraduate curriculum is comprehensive, well-balanced and up-to-date, although some areas need strengthening by new faculty and facilities. Newly planned initiatives in biotechnology will require several new faculty lines. Inadequate physical facilities and outdated equipment are critical problems for curriculum development. The seminar series is extensive and of very high quality. With the dividing of the faculty into three units, particular attention should be paid to protecting the undergraduate programs. Service functions appear to be well-handled. Enhancement of introductory biology teaching by interactive video is being considered. Articulation with community colleges appears to be done very well. The proposed undergraduate and masters programs in biotechnology are extremely relevant; curriculum associated with the proposed undergraduate environmental science track is equally strong. Faculty teaching competence is both diverse and well-balanced, except in a few areas where replacements or new appointments are needed. Research/scholarship expectations have been clearly articulated, and merit adjustments serve as reward to meeting them. The department has contributed significantly to the

overall grant profile for the College of Natural Science. Although the pattern of scholarship and research support is fairly good across the board, there are islands of quality; several faculty have national and/or international reputations. As the graduate program matures, the grade point average required for admission of both M.S. and Ph.D. candidates should be more rigorous. Undergraduate and graduate students were generous in their constructive suggestions for improving the department and should be listened to. The library requires a significant increase in funding if it is to support the research and scholarship needs of the department. Many teaching laboratories are inadequately equipped and poorly maintained; some are shamefully out-of-date. The expendable purchases budget is severely limiting, and the equipment budget is totally inadequate with the result that teaching equipment is antiquated. The department has come to depend too much on equipment garnered through faculty research efforts. The designation of an "equipment master" for each piece of major equipment is commendable. Support staff are excellent, but departmental secretaries are overworked, and realistic expectations of faculty of their services need to be determined. Space remains a critical problem, renovation having but barely alleviated some of the most severe problems. The Ecological Research Area is internationally known because of the long-term studies of fire ecology; its diversity of habitats make it an invaluable resource. The University must be a thoughtful steward of this critically important resource; likewise for the Botany Garden.

UWF. The Curriculum is broad and no longer skewed to the marine sciences. There is, however, a large list of courses some of which are apparently not taught often. A wide range of specialties is represented but molecular biology is underrepresented. There is good cooperation with other departments for service courses in both directions. A year-long physics course for all majors should be considered, and the option of either calculus or statistics should be reconsidered. There is need for a strong biology-based Coastal Zone Studies program, and the Environmental Biology group should develop a coherent, strong program to ensure CZS viability. The General Biology/ Microbiology track integrates well into the department and is a strong addition to departmental offerings. The medical technology program, however, does not integrate into the curriculum in holistic fashion. Further, the expensive nature of such a program and the changed relationship with the local hospital(s) suggest that continuation of the program may not be justified. There is currently not enough effort to communicate with the community colleges; plans to revive outreach efforts should be implemented. The planning for a new program in biotechnology, which would require a new position in molecular biology and genetics, should be predicated on a well done study of the need for such a program. Teaching is of generally high quality, students and other departments voicing a high degree of satisfaction. There is some outstanding original research performed, and an impressive amount of outside funds is generated from a variety of agencies. Many of these funds, however, are in the form of contracts that support applied research which too often does not lead to publication in refereed, scholarly journals. Some of the low research productive faculty are

excellent teachers, but need encouragement to renew their research activities. Current teaching assistant stipends are quite inadequate and well below par with most other universities. A more structured program of obtaining data from graduates is needed. Library holdings are excellent, although monograph holdings could use increased support. Research space is reasonable for the size of the program; renovation of the space allocated for a new laboratory for lower division courses has not progressed and needs attention. There is ample data processing equipment, but it does not appear to play a role in the teaching classrooms and laboratories. The department is well equipped but much was obtained through grants and contracts. Attention is needed to maintenance and repair of current equipment holdings. Service contracts should be undertaken on some equipment. Laboratory support staff, based primarily in Chemistry, serve well the needs of Biology, except for maintenance of boats and the collection of marine animals. Space is efficiently used and common and shared use is the norm: there is excellent cooperation between Biology and Chemistry in the sharing of space and facilities. Storage and shop space is, however, inadequate. The department should consider giving more responsibilities to teaching assistants for certain laboratory sections. The most critical issue in the department is the existence of two separate faculty groups, each with its own chair, secretary and office facilities. This, in a relatively small faculty, presents some rather ominous overtones for the future development of the life sciences in curricular relations to other departments, curricular ramifications within the programs of the two groups that may adversely affect students from the other division, resource duplication, and the like. This divisioning

of the department is not supportable and should be rescinded immediately. Further, strong consideration should be given to hiring a chair from the outside who has authority and who would endeavor to minimize the current devisiveness and funnel faculty energies into the productive teaching and scholarship of which they are capable.

APPENDIX A

LIFE SCIENCE--HEADCOUNT BY DISCIPLINE, RACE, AND SEX, FALL 1984
Educational and General

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF													
Life Sciences	354	15	45	16	430	234	22	32	12	300	6	29	765
FSU													
Life Sciences	382	23	24	14	443	294	36	12	9	351	6	27	827
FAMU													
Life Sciences	3	46	....	....	49	2	50	....	....	52	....	4	105
USF													
Life Sciences	422	18	57	10	507	328	19	37	10	394	....	25	926
FAU													
Life Sciences	81	8	7	2	98	104	5	6	2	117	....	23	238
UWF													
Life Sciences	84	2	4	1	91	76	2	3	1	82	....	2	175
UCF													
Life Sciences	155	9	16	6	186	188	5	20	7	220	....	8	414
FIU													
Life Sciences	51	3	48	4	106	39	10	31	1	81	....	20	207
UNF													
Life Sciences	15	3	2	....	20	20	2	....	1	23	1	2	46
SUS													
Life Sciences	1,547	127	203	53	1,930	1,285	151	141	43	1,620	13	140	3,703

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.
[2]Includes nonresident aliens and students who did not report race.
NOTE: Excludes USF Medical Center, UF Health Center, EIES, IFAS and students on staff waivers.
SOURCE: Factbook 1984-85

NTK.HEADCOUNT.LIFE SCI

Table 1

LIFE SCIENCE--HEADCOUNT BY DISCIPLINE, RACE, AND SEX, FALL 1984
Educational and General

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF													
Life Sciences	354	15	45	16	430	234	22	32	12	300	6	29	765
FSU													
Life Sciences	382	23	24	14	443	294	36	12	9	351	6	27	827
FAMU													
Life Sciences	3	46	....	....	49	2	50	....	....	52	....	4	105
USF													
Life Sciences	422	18	57	10	507	328	19	37	10	394	....	25	926
FAU													
Life Sciences	81	8	7	2	98	104	5	6	2	117	....	23	238
UWF													
Life Sciences	84	2	4	1	91	76	2	3	1	82	....	2	175
UCF													
Life Sciences	155	9	16	6	186	188	5	20	7	220	....	8	414
FIU													
Life Sciences	51	3	48	4	106	39	10	31	1	81	....	20	207
UNF													
Life Sciences	15	3	2	....	20	20	2	....	1	23	1	2	46
SUS													
Life Sciences	1,547	127	203	53	1,930	1,285	151	141	43	1,620	13	140	3,703

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.
[2]Includes nonresident aliens and students who did not report race.
NOTE: Excludes USF Medical Center, UF Health Center, EIES, IFAS and students on staff waivers.
SOURCE: Factbook 1984-85

NTK.HEADCOUNT.LIFE SCI

Table II

BACHELOR'S DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1981-82

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF Biological Sciences	72	2	12	3	89	47	...	5	...	52	...	5	146
FSU Biological Sciences	55	2	2	1	60	22	3	1	...	26	4	3	93
FAMU Biological Sciences	...	5	...	...	5	...	1	...	1	...	...	...	6
USF Biological Sciences	61	...	4	...	65	35	...	2	...	37	...	1	103
FAU Biological Sciences	12	...	1	...	13	12	...	...	...	12	...	2	27
UWF Biological Sciences	13	...	2	...	15	11	...	...	...	11	1	...	27
UCF Biological Sciences	28	...	...	...	28	17	...	2.	1	20	...	...	48
FIU Biological Sciences	3	...	4	...	7	6	1	6	...	13	1	...	21
UNF Biological Sciences	4	...	...	...	4	1	...	...	...	1	1	...	6

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2]Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1981-82 NCES from 2300-2.1 -- Degrees and other formal awards conferred.

NTK.C.DEGREES GRANTED 81-85

Table I

BACHELOR'S DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1982-83

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF													
Biological Science	85	3	4	5	97	48	2	9	2	61	...	5	163
FSU													
Biological Science	55	3	2	...	60	27	3	...	...	30	5	...	95
FAMU													
Biological Science	1	6	...	2	9	...	2	...	...	2	...	...	11
USF													
Biological Science	61	...	5	...	66	40	1	4	1	46	...	...	112
FAU													
Biological Science	10	...	...	...	10	22	...	1	...	23	...	...	33
UWF													
Biological Science	21	...	...	...	21	11	...	...	...	11	...	1	33
UCF													
Biological Science	21	...	...	...	21	13	1	...	...	14	...	1	36
FIU													
Biological Science	8	1	1	...	10	7	...	3	1	11	...	1	22
UNF													
Biological Science	2	...	...	...	2	1	...	...	...	1	...	...	3

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2]Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1982-83 NCES from 2300-2.1 -- Degrees and other formal awards conferred.

NTK.C.DEGREES GRANTED 81-85

Table I

BACHELOR'S DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1983-84

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF													
Life Sciences	80	2	7	3	92	47	3	3	6	59	2	8	161
FSU													
Life Sciences	63	3	2	...	68	39	1	...	...	40	4	3	115
FAMU													
Life Sciences	...	9	...	...	9	...	2	...	...	2	...	1	12
USF													
Life Sciences	51	1	9	1	62	45	6	4	...	55	...	5	122
FAU													
Life Sciences	9	1	2	...	12	13	...	...	...	13	...	1	26
UWF													
Life Sciences	15	...	2	1	18	9	1	1	3	14	...	...	32
UCF													
Life Sciences	19	...	3	...	22	15	...	1	1	17	...	1	40
FIU													
Life Sciences	2	...	5	1	8	6	...	1	...	7	...	3	18
UNF													
Life Sciences	3	1	...	...	4	3	...	...	1	4	1	...	9

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2]Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1983-84 NCES from 2300-2.1 -- Degrees and other formal awards conferred.

NTK.C.DEGREES GRANTED 81-85

BACHELOR DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1984-85

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF Life Sciences	100	3	10	3	116	44	1	10	4	59	1	7	183
FSU Life Sciences	50	2	3	1	56	24	3	...	2	29	1	1	87
FAMU Life Sciences	...	1	...	...	1	...	3	...	...	3	...	2	6
USF Life Sciences	54	2	9	2	67	31	2	5	...	38	...	1	106
FAU Life Sciences	7	1	1	...	9	11	...	...	...	11	...	4	24
UWF Life Sciences	13	...	1	...	14	14	1	2	1	18	...	2	34
UCF Life Sciences	13	2	1	1	17	18	...	2	2	22	...	2	41
FIU Life Sciences	6	...	3	...	9	1	1	3	...	5	...	2	16
UNF Life Sciences	1	...	...	...	4	4	...	...	...	4	...	...	5

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2]Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1984-85 NCES from 2300-2.1 -- Degrees and other formal awards conferred.

NTK.C.DEGREES GRANTED 81-85

Table 3

MASTER'S DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1981-82

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF													
Biological Science	8	1	2	6	17	3	...	...	1	4	...	6	27
FSU													
Biological Science	12	1	...	...	13	5	...	...	...	5	...	1	19
FAMU													
Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
USF													
Biological Science	7	...	...	...	7	5	...	1	...	6	...	...	13
FAU													
Biological Science	4	...	...	...	4	1	...	...	...	1	...	...	5
UWF													
Biological Science	5	...	...	...	5	...	...	...	...	...	...	...	5
UCF													
Biological Science	6	...	...	...	6	3	...	...	...	3	...	...	9
FIU													
Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
UNF													
Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2]Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1981-82 NCES from 2300-2.1 -- Degrees and other formal awards conferred. NTK.C.DEGREES GRANTED 81-85

Table II

MASTER'S DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1982-83

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF													
Biological Science	14	1	1	...	116	17	...	...	...	17	...	12	45
FSU													
Biological Science	12	...	1	...	13	1	...	...	...	1	...	...	14
FAMU													
Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
USF													
Biological Science	10	...	...	...	10	3	...	...	...	3	...	...	13
FAU													
Biological Science	4	...	...	...	4	4	...	...	...	4	...	1	9
UWF													
Biological Science	4	...	...	1.	5	.4	...	...	...	4	...	...	9
UCF													
Biological Science	2	...	...	...	2	2	...	...	...	2	...	...	4
FIU													
Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
UNF													
Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2]Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1982-83 NCES from 2300-2.1 -- Degrees and other formal awards conferred.

NTK.C.DEGREES GRANTED 81-85

Table II

MASTER'S DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1983-84

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF													
Life Sciences	16	...	...	...	16	11	...	...	...	11	1	4	32
FSU													
Life Sciences	5	...	...	...	5	2	...	...	...	2	...	...	7
FAMU													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
USF													
Life Sciences	7	...	1	...	8	7	...	...	...	7	...	1	16
FAU													
Life Sciences	1	...	...	...	1	3	...	...	...	3	...	2	6
UWF													
Life Sciences	6	...	...	...	6	...	...	...	...	...	...	...	6
UCF													
Life Sciences	2	...	...	...	2	2	...	...	...	2	...	...	4
FIU													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
UNF													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2]Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1983-84 NCES from 2300-2.1 -- Degrees and other formal awards conferred.

NTK.C.DEGREES GRANTED 81-85

MASTER'S DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1984-85

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF													
Life Sciences	10	...	...	...	10	8	...	1	1	10	...	7	27
FSU													
Life Sciences	4	...	...	...	4	9	...	...	...	9	...	...	13
FAMU													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
USF													
Life Sciences	6	...	...	...	6	6	...	...	...	6	...	2	14
FAU													
Life Sciences	3	...	...	...	3	1	...	...	...	1	...	1	5
UWF													
Life Sciences	3	...	...	...	3	2	...	...	...	2	...	...	5
UCF													
Life Sciences	2	...	...	...	2	3	...	...	...	3	...	...	5
FIU													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
UNF													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...

[1] Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2] Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1984-85 NCES from 2300-2.1 -- Degrees and other formal awards conferred.

NTK.C.DEGREES GRANTED 81-85

Table III

DOCTORAL DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1981-82

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF Biological Science	14	...	...	1	15	...	...	...	...	...	...	1	16
FSU Biological Science	7	...	...	...	7	...	...	...	...	...	1	...	8
FAMU Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
USF Biological Science	2	...	...	...	2	...	...	...	...	...	...	...	2
FAU Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
UWF Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
UCF Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
FIU Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
UNF Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2]Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1981-82 NCES from 2300-2.1 -- Degrees and other formal awards conferred.

NTK.C.DEGREES GRANTED 81-85

Table III

DOCTORAL DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1982-83

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF Biological Science	18	...	...	1	19	10	...	...	...	10	...	5	34
FSU Biological Science	11	...	...	...	11	2	...	...	...	2	...	1	14
FAMU Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
USF Biological Science	4	...	...	...	...	4	...	...	...	...	...	...	4
FAU Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
UWF Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
UCF Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
FIU Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...
UNF Biological Science	...	...	...	...	...	...	...	...	...	...	...	...	...

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2]Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1982-83 NCES from 2300-2.1 -- Degrees and other formal awards conferred.

NTK.C.DEGREES GRANTED 81-85

Table III

DOCTORAL DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1983-84

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF Life Sciences	12	...	1	...	13	3	...	...	...	3	...	4	20
FSU Life Sciences	8	...	...	1	9	2	...	...	1	3	2	...	14
FAMU Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
USF Life Sciences	6	...	...	...	6	...	...	...	...	...	...	...	6
FAU Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
UWF Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
UCF Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
FIU Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
UNF Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2]Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1983-84 NCES from 2300-2.1 -- Degrees and other formal awards conferred.

NTK.C.DEGREES GRANTED 81-85

DOCTORAL DEGREES GRANTED BY INSTITUTION, BY DISCIPLINE, RACE, AND SEX -- 1984-85

Discipline	Male					Female					Race/Sex Unknown	Nonresident Alien	Grand Total(2)
	White	Black	Hispanic	Other(1)	Total	White	Black	Hispanic	Other(1)	Total			
UF													
Life Sciences	23	...	...	...	23	5	...	...	...	5	...	8	36
FSU													
Life Sciences	9	1	...	1	11	1	...	...	...	1	...	1	13
FAMU													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
USF													
Life Sciences	3	...	...	...	...	3	...	...	...	...	...	...	3
FAU													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
UWF													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
UCF													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
FIU													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...
UNF													
Life Sciences	...	...	...	...	...	...	...	...	...	...	...	...	...

[1]Asians and Pacific Islanders, American Indians, and Alaskan Natives.

[2]Includes nonresident aliens and students who did not report race.

NOTE: Includes students who did not report gender.

SOURCE: 1984-85 NCES from 2300-2.1 -- Degrees and other formal awards conferred.

NTK.C.DEGREES GRANTED 81-85

FULL-TIME FACULTY IN THE LIFE SCIENCES BY SEX, RACE, AND AGE -- FALL 1986

FLORIDA A&M UNIVERSITY

SEX/RACE	AGE: (1-29)	(30-39)	(40-49)	(50-59)	(60-69)	(70&OVER)	AV AGE
Female			3				45
Black			2				43
Hispanic							
White							
Other			1				49
Male			1	2			51
Black				1			55
Hispanic							
White			1				47
Other				1			50
Total			4	2			48
Black			2	1			47
Hispanic							
White			1				47
Other			1	1			49

FLORIDA ATLANTIC UNIVERSITY

SEX/RACE	AGE: (1-29)	(30-39)	(40-49)	(50-59)	(60-69)	(70&OVER)	AV AGE
Female			1				45
Black							
Hispanic							
White			1				45
Other							
Male		1	3	5	1		50
Black							
Hispanic							
White		1	3	5	1		50
Other							
Total		1	4	5	1		49
Black							
Hispanic							
White		1	4	5	1		49
Other							

FLORIDA INTERNATIONAL UNIVERSITY

SEX/RACE	AGE: (1-29)	(30-39)	(40-49)	(50-59)	(60-69)	(70&OVER)	AV AGE
Female		2					34
Black							
Hispanic							
White		2					34
Other							
Male		3	8	1	1		43
Black			1				47
Hispanic				1			57
White		3	5		1		42
Other			2				47
Total		5	8	1	1		42
Black			1				47
Hispanic				1			57
White		5	5		1		39
Other			2				47

SOURCE: Fall 1986 Authorized Position File (all budget entities)

FULL-TIME FACULTY IN THE LIFE SCIENCES BY SEX, RACE, AND AGE -- FALL 1986

UNIVERSITY OF NORTH FLORIDA

SEX/RACE	AGE:	(1-29)	(30-39)	(40-49)	(50-59)	(60-69)	(70&OVER)	AV AGE
Female	none							
Black								
Hispanic								
White								
Other								
Male	none							
Black								
Hispanic								
White								
Other								
Total	none							
Black								
Hispanic								
White								
Other								

UNIVERSITY OF SOUTH FLORIDA

SEX/RACE	AGE:	(1-29)	(30-39)	(40-49)	(50-59)	(60-69)	(70&OVER)	AV AGE
Female			3		2			42
Black								
Hispanic								
White			3		2			42
Other								
Male		1	10	16	6	1		43
Black								
Hispanic					1			50
White		1	9	16	5	1		43
Other			1					38
Total		1	13	16	8	1		43
Black								
Hispanic					1			50
White		1	12	16	7	1		43
Other			1					38

UNIVERSITY OF WEST FLORIDA

SEX/RACE	AGE:	(1-29)	(30-39)	(40-49)	(50-59)	(60-69)	(70&OVER)	AV AGE
Female			1	1				36
Black								
Hispanic								
White				1				42
Other			1					30
Male				1	1			48
Black								
Hispanic								
White					1			51
Other				1				45
Total			1	2	1			42
Black								
Hispanic								
White				1	1			46
Other			1	1				38

SOURCE: Fall 1986 Authorized Position File (all budget entities)

FULL-TIME FACULTY IN THE LIFE SCIENCES
BY SEX, RACE, AND AGE -- FALL 1986

STATE UNIVERSITY SYSTEM

SEX/RACE AGE:	(1-29)	(30-39)	(40-49)	(50-59)	(60-69)	(70&OVER)	AV AGE
Female		10	11	2			40
Black			3				37
Hispanic							
White		9	7	2			40
Other		1	1				40
Male	1	58	90	55	18	1	46
Black			2	1			50
Hispanic		1		2			48
White	1	53	84	49	18	1	46
Other		4	4	3			44
Total	1	68	101	57	18	1	46
Black			5	1			46
Hispanic		1		2			48
White	1	62	91	51	18	1	46
Other		5	5	3			43

SOURCE: Fall 1986 Authorized Position File (all budget entities)

APPENDIX B

CURRICULUM VITAE
OF
EDWARD J. KORMONDY

Born: Beacon, New York

EDUCATION

1950 B.S.	(Biology) Tusculum College, Summa Cum Laude
1951 M.S.	(Zoology) University of Michigan
1955 Ph.D.	(Zoology) University of Michigan
1963-64	Postdoctoral Fellowship in Radiation Ecology, University of Georgia
1978-79	Visiting Research Fellow, Center for Bioethics, Georgetown University

POSITIONS

University of Michigan

1952-55	Teaching Fellow in Zoology
1955-57	Instructor in Zoology and Curator of Insects, Museum of Zoology

Oberlin College

1957-63	Assistant Professor of Zoology
1963-67	Associate Professor of Zoology
1966-67	Acting Associate Dean, College of Arts & Sciences
1967-69	Professor of Biology

University of Pittsburgh

1960-62	(Summers) Assistant Professor of Biology, Laboratory and Field Ecology

Commission on Undergraduate Education in the Biological Sciences

1968-72	Director

American Institute of Biological Sciences

1968-71	Director, Office of Biological Education

The Evergreen State College

1971-79	Member of the Faculty (Biology, Ecology)
1972-73	Interim Acting Academic Dean
1973-78	Vice President and Provost

National Science Foundation

1979	(Jan.-Aug.) Senior Professional Associate, Directorate for Science Education

University of Southern Maine

1979-82	Provost and Professor Biology

California State University - Los Angeles
1982-86 Vice President for Academic Affairs and Professor of Biology

University of Hawaii at Hilo/West Oahu
1986- Chancellor and Professor of Biology

FUNDED RESEARCH

National Academy of Sciences and American Philosophical Society: Biology of the Odonata
National Science Foundation and the Society of Sigma XI: Productivity in ecological succession
Atomic Energy Commission: Biochemistry of Zinc
National Science Foundation: Four films in Social Biology

PROFESSIONAL ORGANIZATIONS (Major)

American Association for the Advancement of Science (Fellow)
Ecological Society of America
National Science Teachers Association
National Association of Biology Teachers
Society of Sigma XI
Southern California Academy of Science

PROFESSIONAL ACTIVITIES (Major)

Curriculum Consultant in Biology and Interdisciplinary Studies: Southwestern at Memphis, Centre College of Kentucky, Bluffton College, Regis College, Wheaton College (Illinois), Marymount College of Virginia, Tennessee Technological University, Eastern Carolina University, Michigan State University, Pacific University, University of Nevada (Reno), Grinnell College, Sangamon State University, Governors State University, University of Minnesota-Duluth, Stockton State College, Whitman College, Rollins College, Colorado College, Fairleigh Dickinson University, East Texas State University, Universidad Simon Bolivar (Caracas, Venezuela), Assumption College, University of Colorado.

Lead Consultant, Biology Review of State University System of Florida's nine Universities, 1978 & 1986. Special Consultant, Florida International University Ph.D. Program in Biology, 1988.

Content Consultant: Ginn and Company elementary sciences series (1967-); Science Research Associates high school laboratory biology project (1967-68); Portland State University Secondary School Interdisciplinary Project (1969); Clearvue Ecology Program (1970-72); Addison-Wesley Publishing Company high school biology project (1975-).

Research Seminars: Universities of Georgia, Miami, Michigan,

Pittsburgh, Washington; Cornell, Florida A&M University, Catholic, Georgetown, George Washington Universities; Baldwin Wallace, Bennington, Dartmouth, Hampshire, Hobart and William Smith, Randolph-Macon Colleges; City College of the City of New York; Southwestern at Memphis, Catonsville Community College, SUNY-Plattsburgh, Universidad Simon Bolivar, Universidad de los Andes, Instituto Venezolano de Investigaciones Ciencias (Venezuela); Ecological Section, Hungarian Academy of Sciences (Budapest).

Accreditation Teams: Commission on Colleges, Northwest Association of Schools and Colleges - Portland State University, Eastern Washington University; New England Association of Schools and Colleges - Cambridge College/Institute of Open Education, University of Lowell (Chairman), Emerson College (Chairman), University of Massachusetts in Boston (Chairman), San Francisco State University. Accrediting commission for State Colleges & Universities on Higher Education, Western Association of Schools & Colleges (Commissioner 1987-).

Manuscript Reviewer: Manuscript reviews for various publisher including Prentice-Hall, McGraw Hill, W. W. Norton, Wadsworth, W. C. Brown, Harcourt Brace Jovanovich.

Book Reviewer: Regularly for Quarterly Review of Biology, American Biology Teacher, Choice, and irregularly for Ecology.

Trustee: Tusculum College (1971-73); National Foundation for Environmental Education (1971-75).

Editor: Science and Society Series, Biological Sciences Curriculum Study (1969-73); Four Films in Social Biology (1971-78).

Advisory Committees: Purdue Minicourse Project (1971-74); Florida State University Individualized Science Instructional System (1973-77).

Editorial Boards: Journal of Biological Education (1968-73); International Journal of Environmental Studies (1970-73); Journal of College Science Teaching (1984-87).

Professional and Educational Organizations:

American Association for the Advancement of Science Course Director, Chautauqua Short Courses (1970-73)
American Association of State Colleges and Universities, Academic Affairs Resource Center State Representatives (1985-)
American Institute of Biological Sciences Visiting Radiation Biologist (1960-68)

Biological Sciences Curriculum Study
Consultant, intermediate life sciences program (1967-70)
Editor, Science and Society Series (1960-73)
Revision team, Green version BSCS textbook (1970-73)

Southern California Academy of Sciences
Board of Directors (1985-86)

Educational Testing Services
Designer, College Level Examination Program in Biology, (1968-70)
Advanced Placement in Biology Committee, (1971-73, 1975-78)
Development Committee for Advanced Placement and CLEP, (1975-76)

Ecological Society of America
Education Committee (1966-68; 1980-)
Secretary (1976-78)
Representative to AIBS (1978-79)

National Association of Biology Teachers
Board of Directors (1974-76)
Executive Committee (1975-76; 1980-82)
President-elect (1980)
President (1981)
Past President (1982)
Representative to AAAS Section Q (Education) (1980-) Chair, ad hoc Committee to Develop an Ethics Statement for Biology Teachers (1985-)

National Coalition for Science & Technology
Board of Advisors (1981-)

National Science Foundation
Reviewer, consultant and panel member on numerous proposals and programs in basic research and science education.
Instructor: Institute for College Biology Teachers, Williams College (1966-67) and Drew University (1968, 1969); Short Course in Ecology, University of North Carolina (1970).
Advisor, Office of Experimental Projects and Programs, Education Directorate (1975-76)
Panel Member, Public Understanding of Science Program, Science and Society Section, Directorate for Science Education, (January-August 1979)

Los Angeles County Arboretum Environmental Education Committee, (1985-86)

Cultural Exchange:
U.S. Department of State
Environmental Education in Poland and Hungary (Jan. - Feb. 1978)
U.S. Department of Education
Educational research mission to the People's Republic of China (Sept. - Oct. 1980)

California State University, Los Angeles
Group leader to Northern Jiaotong University,
Beijing, People's Republic of China (October 1985)
American Association of State Colleges & Universities
Mission to China (June 1987)

Recognition:
American Men of Science
Golden Key National Honor Society
The Honor Society of Phi Kappa Phi
Who's Who in America
Who's Who in California (16th Ed.)
Who's Who in the West
Who's Who in Frontiers of Science & Technology
International Leaders in Achievement
5,000 Personalities of the World

PUBLICATIONS
(60+ total; only major titles listed)

Papers:

1958 Catalogue of the Odonata of Michigan, Misc. Publ. Mus. Zool., University of Michigan 104:1-43.

1959 The systematics of Tetragoneuria, based on ecological, life history, and morphological evidence (Odonata: Corduliidae), Misc. Publ. Mus. Zool., University of Michigan 107:1-79.

1961 Territoriality and dispersal in Odonata. Journ, N.Y. Ent. Soc. 69:42-52.

1962 Experiment in self-instruction in general biology (with E.L. Van Atta). Ohio Journ. Sci. 62:4-10.

1965 Uptake and loss of zinc-65 in the dragonfly Plathemis lydia. Limnology and Oceanography 10:427-433.

Life history variations in an association of Odonata. Ecology 46:882-886.

1968 Decomposition of a cellulose and aquatic macrophytes in a Carolina Bay. Limnology and Oceanography 13:522-526.

1969 Comparative ecology of sandspit ponds. American Midland Naturalist 82:28-61.

1970 Ecology and the environment of man. BioScience 20 (13):751-754.

Lake Erie is aging but effort can save it from death. Smithsonian 1 (9):26-33.

1971 Environmental education: The whole man revisited. American Biology Teacher 33:15-17.

1974 A Survey of first-year biology courses (with William Kastrinos and Gertrude Sanders). American Biology Teacher 33:15-17.

Etica biologica: ingenieria ecologia. Resumen IV (44):52-55. (Venezuela).

Government and academia: roles and responsibilities in man's environmental crisis. The Environmental Challenge, ed. W. H. Johnson and W. C. Steere (Holt, Rinehart, and Winston), pp 275-299.

Natural and human ecosystems. In Human Ecology, ed. F. Sargent (North Holland Publishing Co.)., pp. 27-43.

The College teacher and social responsibility, pp. 13-16 in Social Responsibility of Educators, RUCTA (Rajasthan University and College Teachers Association) Japur, India.

1975 Bioethics: Toward Ecological Engineering. Ch. 37 (pp. 784-797) in CRM Biology Today (2d ed). Del Mar, Calif: CRM Publishing Co. Random House.

The Evergreen State College: An Alternative, pp. 202-206 in J. F. Hughes and O. Mills, Formulating Policy in Post Secondary Education. The Search for Alternatives. Washington, D.C.: American Council on Education.

1977 Developing administrative strategies for curricular change. In C. C. Mondale (ed.) Administrative Strategies for Curricular Change, Washington, D. C. George Washington University (pp. 2-6).

1978 Ecology/Economy of Nature-Synonyms? Ecology 59:1292-94 (review).

1979 Environmental awareness and education in Hungary and Poland. American Biology Teacher 41:363-367.

College Biology as a science and a profession. American Biology Teacher 41:214-216, 232.

1980 Currency in subject matter. Science 207:365 (editorial).

Environmental protection in Hungary and Poland; government and people. Environment 22:31-37.

1981 Human intervention in natural ecosystems: The scientific background to moral choice, In R. Schultz and D. Hughes (ed.) Ecological Consciousness, University Press of America, pp. 23-42.

1982 Values and choices. In F. Hickman and J. B. Kahle (ed.) New Directions in Biology Teaching, National Association of Biology Teachers, pp. 15-32.

The People's Republic of China: Revitalizing an educational system. Change 14:32-37.

Guest Editorial: We propose and nature disposes. In G. T. Miller Living in the Environment, 3rd ed. pp. 101.

1983 Preparation of secondary school biology teachers in the People's Republic of China (with Paul Hurd). American Biology Teacher 45:83-89, 108.

Improving the quality of life (a commentary): El Pais (Madrid) (2/20/83), pp. 12-13.

1984 Human ecology: An introduction for biology teachers. American Biology Teacher 46:325-329.

World Population and Food Supplies (a commentary): El Pais (Madrid) (4/29/84), pp. 12-13.

Developing technology and its impact on education. Campo Libre 2 (1-2):61-67.

Guest editorial: Human disruption of ecosystems. In O. S. Owen. Natural Resource Conservation. 4th ed. Macmilliam Publ. Co.

1985 Science Education: The Challenge of the 80's. American Biology Teacher 47:402-409.

The natural processes of sandspit ponds. In E. C. Masteller and C. Baxter. Tomorrow's Oasis Today. Proceedings of the Conference on Presque Isle and The Erie Bayfront, Erie, Pennsylvania, September 26-27, pp. 31-34.

In Press, Ethics and values in the biology classroom. In W. V. Mayer (ed.) New Trends in Biology Teaching, Vol. V. UNESCO.

BOOKS (Author or Coauthor)

Introduction to Genetics, A Program for Self-Instruction, 1964, Mc-Graw Hill Co., Spanish edition, 1975.

Concepts of Ecology, 1969, 1976 (2 ed.), 1983 (3rd.). Prentice-Hall, Inc. Finish edition 1971, Spanish edition 1973, India edition 1978.

Environmental Education: The Adult Public, 1970, American Institute of Biological Sciences.

Environmental Education: Academia's Response, 1972 (with J. Aldrich). Commission on Undergraduate Education in the Biological Sciences.

General Biology: The Integrity and Natural History of Organism, 1977 (with Thomas Sherman et al.) Wadsworth Publ. Co.

Environmental Science: The Way the World Works, (by B. J. Nebel, with editorial assistance by E. J. Kormondy), 1981, 1987 (2 ed.), Prentice-Hall, Inc.

Biology. Addison-Wesley Publishing Company. 1984, 1988 (2 ed.), (a high school textbook with Bernice Essenfeld).

ANTHOLOGIES (Editor and/or Coeditor)

Readings in Ecology, 1965, Prentice-Hall, Inc.

Readings in General Biology, 1966, Wm. C. Brown Co.
Vol. I., Molecules and Cells
Vol. II., Organisms, Populations and Ecosystems

Population and Food (co-edited with R. Leisner), 1971, Wm. C. Brown Co.

Pollution (co-edited with R. Leisner), 1971, William C. Brown Co.

Ecology (co-edited with R. Leisner), 1971, William C. Brown Co.

Handbook of Contemporary Developments in World Ecology, 1981, (with J. Frank McCormick). Greenwood Press.

International Handbook of Pollution Control, Scheduled 1988. Greenwood Press.

SERIES EDITOR (for Biological Sciences Curriculum Study)

Garret T. Hardin, 1970. Birth Control. Western Publishing Co.

E. Peter Volpe, 1971. Human Heredity and Birth Defects. The Bobbs-Merrill Co., Inc.

Andrew J. Meyerriecks, 1972. Man and Birds. The Bobbs-Merrill Co., Inc.

Ruthann LeBaron, 1972. Hormones: A Delicate Balance. The Bobbs-Merrill Co., Inc.

Dolores Elaine Keller, 1972. Sex and the Single Cell. The Bobbs-Merrill Co., Inc.

W. R. Klemm, 1972. Science, the Brain, and Our Future. The Bobbs-Merrill Co., Inc.

Melvin H. Weinswig, 1973. Use and Misuse of Drugs Subject to Abuse. The Bobbs-Merrill Co., Inc.

David M. Prescott, 1973. Cancer: The Misguided Cell. The Bobbs-Merrill Co., Inc.

Ingrith D. Olsen, 1973. Metabolism. The Bobbs-Merrill Co., Inc.

Wilfred T. Neill, 1974. Reptiles and Amphibians in the Service of Man. The Bobbs-Merrill Co., Inc.

Paul R. Gastonguay, 1974. Evolution for Everyone. The Bobbs-Merrill Co., Inc.

Horace F. Quick, 1974. Population Ecology. The Bobbs-Merrill Co., Inc.

Priscilla Mattson, 1976. Regeneration. The Bobbs-Merrill Co., Inc.

Charles E. Kupchella, 1976. Sights and Sounds: The Very Special Senses. The Bobbs-Merrill Co., Inc.

PRESENTATIONS (Recent)

International Conference on Technology & Culture in the Mexico - United States Border, La Jolla, CA., October 10, 1983. Plenary session talk: "Developing technology and its impact on education."

National Association of Biology Teachers, Annual Meeting, Philadelphia, PA., October 22, 1983. Chaired panel on "Technological Advance: Impact on Environment and Education."

American Association of State Colleges & Universities, National Conference on Today's Student - Tomorrow's World: The International Responsibility of Higher Education. Long Beach, CA., April 7, 1984. Panel discussion on "Approaches to International Linkages."

New Jersey Sciences Convention, October 3, 1984, Brunswick, N.J. Plenary session talk: "Science Education: The Challenge of the 80's."

National Association of Biology Teachers, Annual Meeting, W. Lafayette, Ind., November 10, 1984. Featured presentation: "Science Education: The Challenge of the 80's."

California Cooperative Education Association, Annual Conference, Sacramento, CA., March 28, 1985. Featured presentation: "Academic and Administrative Perspectives of Cooperative Education."

National Institute of Education, Western Regional Conference: "Quality in American Higher Education," Los Angeles, May 4, 1985. Panel on Joint Ventures of Employers and Institutions for Undergraduate Education: "Cooperative Education: A Link Between Industry and Academe."

Conference on Presque Isle/Erie Bayfront Area: "Tomorrow's Oasis Today," Erie, Pennsylvania, September 26-27, 1985. Major presentation: "The Natural Processes of Sandspit Pond."

Conference on Pathways to Better Science Teaching, Long Beach, CA., January 14, 1986. Workshops: "Introducing Human Ecology into the Curriculum."

APPENDIX C

UNIVERSITY COORDINATORS

LIFE SCIENCES

UF	Dr. Frank Nordlie Professor & Chairman Department of Zoology College of Liberal Arts and Sciences 223 BAR	SC 622-1107 904/392-1107
FSU	Larry Abele, Chairman Biological Science Department of Zoology College of Liberal Arts and Sciences 223 BAR	SC 284-3700 904/644-3700
FAMU	Dr. A. S. Shetty, Chair Department of Biology	SC 286-3907 904/599-3907
USF	Dr. Joseph L. Simon, Professor Biology Department LIF 169	SC 574-3250 813/974-3250
FAU	Dr. Alex Marsh, Chairperson Department of Biological Sciences	SC 463-3324 904/393-3324
UWF	Dr. Peggy A. Winter, Chairperson and Associate Professor of Biology Department of Biology Building 58	SC 251-2274 904/474-2746
UCF	Dr. David Vickers, Professor Department of Biological Sciences	SC 345-2141 305/275-2141
FIU	John Makemson Acting Chairperson Department of Biological Sciences	SC 441-2201 305/554-2201
UNF	Dr. Carole L. Demort Chairperson Department of Natural Sciences	SC 661-2830 904/646-2830

APPENDIX D

Life Sciences Program Review Calendar
November/December, 1986

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
9 NOVEMBER Dr. Kormondy Arrives in Tallahassee	10 Orientation Tallahassee	11 Site Visit FLORIDA STATE	12 Site Visit FLORIDA A&M By AIR to Pensacola	13 Site Visit UNIV. WEST FLA. By AIR to Gainesville	14 Site Visit UNIV. FLORIDA By CAR to Tallahassee	15 Dr. Kormondy Returns Home
16	17	18	19	20	21	22
23	24	25	26	27 THANKSGIVING DAY	28	29
30 Dr. Kormondy Arrives in Miami	1 DECEMBER Site Visit FLORIDA INT'L. UNIVERSITY By CAR to Boca Raton	2 Site Visit FLA. ATLANTIC UNIVERSITY By AIR to Orlando	3 Site Visit UNIV. CENTRAL FLORIDA By AIR to Tampa	4 Site Visit UNIV. SOUTH FLORIDA By AIR to Jacksonville	5 Site Visit UNIV. NORTH FLORIDA Debriefing in Jacksonville	6
7	8	9				